

# SOARING OKLAHOMA AEROSPACE & DEFENSE

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The aerospace industry plays a vital role in protecting commerce and national security for the United States of America. For that reason, the industry is consistently seeking new talent to ensure constant innovation and sustainability. Air superiority has helped the U.S. to come out on top in times of war and our ability to commute freely, and transport goods quickly, continues to play a vital role in our economic well-being. In Oklahoma, the opportunities available within the Aerospace and Defense industry are growing exponentially.

## AIR SUPERIORITY

In 2016, the Enterprise Capability Collaboration Team (ECCT) published the Air Superiority 2030 Flight Plan (AS 2030). This document outlines options that will help to ensure Air Superiority in the year 2030 and beyond. This document states, "Air superiority is a condition on the spectrum of air control, which ranges from adversary air supremacy, to air parity, to friendly air supremacy" (ECCT, 2016).

### Levels of Air Superiority

- ➔ Air Supremacy is the highest level of air superiority in which opposing air forces are incapable of effective interference.
- ➔ Air Parity is the lowest level of air superiority. An air force at this level can only safely occupy skies above allies.

Read the following excerpt from the AS 2030 to better understand the importance of air superiority:

### AIR SUPERIORITY

*Counterair operations are designed to gain control of the air and wrest such control away from an adversary. Air superiority is a condition on the spectrum of air control, which ranges from adversary air supremacy, to air parity, to friendly air supremacy. The air superiority condition is achieved when friendly operations are able to proceed without prohibitive interference from opposing forces.*

*In modern military operations, achieving this level of control of the air is a critical precondition for success. Air superiority provides freedom from attack, freedom to attack, freedom of action, freedom of access, and freedom of awareness. Importantly, it also precludes adversaries from exploiting similar advantages. As such, air superiority underwrites the full spectrum of joint military operations and provides an asymmetric advantage to friendly forces. A lack of air superiority significantly increases the risk of joint force mission failure as well as the cost to achieve victory both in terms of resources and loss of life.*

*In common discourse, air superiority is often envisioned as a theater-wide condition. In highly contested environments, such a conception may be unrealistic and unnecessary. Air superiority is only needed for the time and over the geographic area required to enable joint operations. The specific amount of time and space required varies significantly across scenarios, mission objectives, and phases of conflict. Accordingly, capability development for air superiority must provide options for commanders to array their forces across a range of durations and geographies.*

For full access to the Air Superiority Flight Plan 2030, visit: <http://tinyurl.com/zj5bzft>

### Achieving Air Supremacy

Achieving air supremacy requires implementing the right technologies, collaboration between military personnel, research facilities and the private sector as well as a strong logistical approach and consistent and appropriate data analysis. All of these things are critical for success and they all have one thing in common - they require people with a strong acumen and love of science, technology, engineering and math.



Logistics  
data  
Logistics  
Technology  
Data Analysis  
Collaboration  
Tech

# THE ECONOMIC IMPACT

The economic impact of the aerospace industry on Oklahoma has been felt for decades. In addition to the creation of high paying jobs, aerospace and defense have had an incredible impact on manufacturing in our state.

The search for exceptional talent and skilled workers to fill jobs within the industry is not new, either. Oklahoma continues to highlight the needs of the aerospace industry as job opportunities become available faster than they can be filled.



# THE SCIENCE BEHIND FLYING

The body of an aircraft is meticulously designed to aid in its successful flight.

## Drag

In physics, drag is defined as the retarding force acting on a body (such as an airplane) moving through a fluid (such as air) parallel and opposite to the direction of motion. Drag is influenced by the density, velocity and the area of an object, in addition to the drag coefficient. The drag coefficient is calculated based on the object's shape, density and inclination. Various parts of an airplane are meant to reduce or control drag including the winglets, spoilers and flaps (all parts associated with the aircraft's wings).

## Airflow and Lift

Lift is an aerodynamic force that is available for overcoming the force of gravity. The wings of an aircraft are designed to create and control lift. The wing itself, the slats on the wing and the wing flaps all help to control lift. Lift is created when airflow is pushed in a downward motion, and as Newton's 3rd Law of Motion tells us, "for every action there is an equal and opposite reaction." When looking at an airplane in flight, the opposite reaction to the downward airflow is the force known as lift.

## Thrust

The turbine engines create a thrust force. To create this force, air is forced through a compressor, a combustion chamber and a turbine. The thrust force is what propels a plane.

National Aeronautics and Space Administration

## Airplane Parts and Function

